

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (Original) An electrochemical cell comprising:
 - (a) a cathode comprising an electroactive sulfur-containing material;
 - (b) an anode comprising lithium; and
 - (c) a nonaqueous electrolyte:

wherein the cell exhibits utilization of the electroactive sulfur-containing material of at least 60 % and a charge-discharge efficiency of at least 80 % over at least 10 cycles at a charge rate of about 0.2 mA/cm² and a discharge rate of about 0.4 mA/cm².
2. (Original) The cell of claim 1 wherein the electrolyte comprises:
 - (i) one or more nonaqueous solvents selected from the group consisting of acyclic ethers, cyclic ethers, polyethers, and sulfones; and
 - (ii) one or more N-O additives.
3. (Original) The cell of claim 2 wherein the electrolyte further comprises one or more lithium salts.
4. (Original) The cell of claim 1 that exhibits a charge-discharge efficiency of at least 90%.
5. (Original) The cell of claim 1 that exhibits utilization of the electroactive sulfur-containing material of at least 60% over at least 20 cycles at a discharge rate of about 0.4 mA/cm².
6. (Original) The cell of claim 1 that exhibits utilization of the electroactive sulfur-containing material of at least 60% over at least 50 cycles at a discharge rate of about 0.4 mA/cm².
7. (Original) The cell of claim 6 that exhibits a charge-discharge efficiency of at least 90% at a discharge rate of about 0.4 mA/cm².

8. (Original) The cell of claim 3 that exhibits utilization of the electroactive sulfur-containing material of at least 60% over at least 20 cycles at a discharge rate of about 2.8 mA/cm².
9. (Original) The cell of claim 2 wherein the one or more N-O additives is selected from one or more of the group consisting of inorganic nitrates, organic nitrates, and inorganic nitrites.
10. (Currently Amended) The cell of claim 3 wherein the one or more N-O additives is selected from one or more of the group consisting of inorganic nitrates, organic nitrates, inorganic nitrites, organic nitrites, and organic nitro compounds.
11. (Original) The cell of claim 10 wherein the inorganic nitrate is selected from one or more of the group consisting of lithium nitrate, potassium nitrate, cesium nitrate, barium nitrate, and ammonium nitrate.
12. (Original) The cell of claim 10 wherein the inorganic nitrite is selected from one or more of the group consisting of lithium nitrite, potassium nitrite, cesium nitrite, and ammonium nitrite.
13. (Currently Amended) The cell of claim 10 wherein the organic nitro compound is selected from one or more of the group consisting of nitromethane, nitropropane, nitrobenzene, dinitrobenzene, nitrotoluene, dinitrotoluene, ~~and~~ nitropyridine, dinitropyridine, and nitrobutanes.
14. (Original) The cell of claim 3 wherein the one or more lithium salts is selected from one or more of the group consisting of LiSCN, LiCF₃SO₃, and LiN(CF₃SO₂)₂.
15. (Original) The cell of claim 3 wherein the one or more lithium salts consist of LiSCN and LiN(CF₃SO₂)₂ and the N-O additive comprises lithium nitrate.

16. (Original) The cell of claim 2 wherein the concentration of the one or more N-O additives in the electrolyte is from about 0.02 m to 2.0 m.
17. (Original) The cell of claim 2 wherein the concentration of the one or more N-O additives in the electrolyte is from about 0.1 m to 1.5 m.
18. (Original) The cell of claim 2 wherein the concentration of the one or more N-O additives in the electrolyte is from about 0.2 m to 1.0 m.
19. (Original) The cell of claim 2 wherein the concentration of the one or more lithium salts in the electrolyte is from about 0.2 m to about 2.0 m.
20. (Original) The cell of claim 1 wherein the electroactive sulfur-containing material comprises elemental sulfur.
21. (Original) The cell of claim 1 wherein the anode comprises lithium metal.
22. (Original) The cell of claim 1 that further includes a separator interposed between the anode and the cathode.
23. (Original) A battery comprising a casing and one or more cells of claim 1.
24. (Original) The cell of claim 2 wherein the one or more N-O additives is lithium nitrate.
25. (Original) The cell of claim 2 wherein the nonaqueous solvent comprises dioxolane.
26. (Original) The cell of claim 2 wherein the one or more solvents consists of dimethoxyethane and dioxolane.

27. (New) The cell of claim 10 wherein the organic nitrite compounds are selected from one or more of the group consisting of ethyl nitrite, propyl nitrite, butyl nitrite, pentyl nitrite and octyl nitrite.
28. (New) The cell of claim 3 wherein the one or more lithium salts are selected from one or more of the group consisting of LiSCN, LiBr, LiI, LiClO₄, LiAsF₆, LiSO₃CF₃, LiSO₃CH₃, LiBF₄, LiB(Ph)₄, LiPF₆, LiC(SO₂CF₃)₃, and LiN(SO₂CF₃)₂.
29. (New) The cell of claim 25 wherein the nonaqueous solvent comprises greater than 40% by weight dioxolane.
30. (New) The cell of claim 26 wherein the nonaqueous solvent comprises greater than 40% by weight dioxolane.
31. (New) The cell of claim 2 wherein the nonaqueous electrolyte comprises two or more solvents selected from acyclic ethers, glymes and cyclic ethers.
32. (New) The cell of claim 31 wherein one of the two or more non aqueous solvents is dioxolane.
33. (New) The cell of claim 2 wherein the one or more nonaqueous solvents consist of:
1,3-dioxolane and dimethoxyethane; or
1,3-dioxolane and diethyleneglycol dimethyl ether; or
1,3-dioxolane and triethyleneglycol dimethyl ether; or
1,3-dioxolane and sulfolane.
34. (New) The cell of claim 33 wherein the electrolyte comprises a binary mixture and the weight ratio of the components of the binary mixture are from about 5 to 95 to 95 to 5.
35. (New) The cell of claim 33 wherein the non aqueous solvent comprises greater than 40% by weight dioxolane.